REMARKS

The Applicant has reviewed the Examiner's comments in the Office Action and appreciates the Examiner's care in examining the Application.

In the Office Action, the Examiner first objected to the Drawings under 37 CFR 1.83(a), particularly in view of pending claim 4. The Examiner further rejected claims 3, 4, 7, 14 and 18 under 35 U.S.C. Section 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicant regards as the invention. Additionally, the Examiner rejected claims 1, 5, 6, 8-10, 14-16, 19 and 21-22 under 35 U.S.C. Section 102(b) as being anticipated by Stacey (U.S. Pat. No. 5,140,245), rejected claims 7, 13 and 20 under 35 U.S.C. Section 103(a) as being unpatentable over Stacey in view of King (U.S. Pat. No. 5,345,154), and also rejected claims 2, 11, 12 and 17 under 35 U.S.C. Section 103(a) as being unpatentable over Stacey in view of ordinary skill in the art.

In response to the Office Action, the Applicant has amended claim 4 in order to overcome the Examiner's rejection of that claim for indefiniteness. The Applicant also respectfully traverses each of the Examiner's remaining rejections of the claims, as set forth below. Finally, as discussed below, the Applicant has added a new claim 23 that

recites the single-phase, dog-leg, zig-zag and double delta configurations. For the reasons set forth below, the Applicant respectfully submits that persons of ordinary skill in the art would be capable of employing the present invention with respect to alternators in any of these configurations, even though such configurations are not expressly shown in the drawings.

AMENDMENTS TO THE CLAIMS

In response to the Office Action, the Applicant has amended claim 4 and added a new claim 23. Claim 4 was amended to eliminate any reference to single-phase, dog-leg, zig-zag and double delta configurations of alternators. The Applicant appreciates the Examiner's indication that, because the embodiment of the present invention recited in pending claim 1 operates in conjunction with three phases of output voltages from an alternator, it was not appropriate to recite the single-phase, dog-leg, zig-zag and double delta configurations in claim 4 as depending from claim 1.

However, the Applicant has added new claim 23 that depends from independent claim 15 and does recite single-phase, dog-leg, zig-zag and double delta configurations of the alternator. This is appropriate insofar as independent claim 15, in contrast to independent claim 1, does not recite three phases of output voltages of an alternator. The Applicant

acknowledges that implementation of alternators in the single-phase, dog-leg, zig-zag and double delta configurations is not specifically shown by the drawings. However, the Applicant respectfully submits that implementation of an alternator in any of these configurations is well-known to those of ordinary skill in the art. In particular, it is well known to those skilled in the art that the windings of an alternator can be coupled to one another in a variety of configurations, such that the output leads of the alternator and/or alternative connection terminals on the alternator (e.g., center taps) provide signals having a variety of different phases.

Further, the Applicant respectfully submits that one of ordinary skill in the art would be able to implement embodiments of the present invention in accordance with independent claim 15 in conjunction with any of these types of alternator configurations. Claim 15 itself provides support for such embodiments when it generally recites an outer loop means that provides a first control signal component based upon a plurality of output voltage indications. That is, the present invention is intended to encompass a variety of embodiments in which the first feedback signals (or first portions of the control signals) are generated based upon a variety of differently-phased output voltage values provided from a variety of different types of alternators that output multiple phases of output voltages.

Additionally, the Applicant respectfully submits that claim 23, in view of claim 15, is sufficiently definite to satisfy 35 U.S.C. Section 112. Claim 15 clearly sets forth a system having an outer loop means and an inner loop means each of which develops its own control signal component. Such a system is applicable to a variety of alternators, including delta and wye-configured alternators as well as alternators in the single-phase, dog-leg, zig-zag, and double delta configurations. In common among these different embodiments covered by claim 15 is that two different control signal components are developed and then utilized to control the alternator excitation level. Namely, a first component is developed based upon measurements taken over a longer period of time concerning multiple phases of output voltages of the alternator, and a second component is developed based upon measurements taken over a shorter time concerning those phases or a subset of those phases.

Thus, for at least these reasons, the Applicant respectfully submits that new claim 23 is definite in view of 35 U.S.C. Section 112 and allowable.

OBJECTION TO THE DRAWINGS

As discussed above, the objection to the drawings specifically in reference to claim 4 has been overcome due to the amendment of that claim. As for new independent claim 23,

the Applicant respectfully submits that Fig. 5 adequately shows an embodiment of an alternator in combination with an embodiment of the inventive system, and that one of ordinary skill in the art would be capable of implementing the invention as recited in claim 23 based upon the disclosure in the present Application.

CLAIM REJECTIONS UNDER 35 U.S.C. Section 112

As discussed above, the Applicant has amended claim 4 in order to remove the references to single-phase, dog-leg, zig-zag and double delta configurations. Additionally, the "neutral point" recited in claim 4 is disclosed at page 17, lines 1-9 of the Specification as being a neutral or ground point as employed with a wye-configured alternator, as is well known to those of ordinary skill in the art. Consequently, the Applicant respectfully submits that the Examiner's rejection of claim 4 under 35 U.S.C. Section 112 for indefiniteness has been overcome.

As for the Examiner's rejection of claims 3, 7, 14, and 18 under 35 U.S.C. Section 112 for indefiniteness, the Applicant respectfully traverses the rejection of these claims. With respect to the Examiner's comment concerning claim 3, the "fourth RMS voltage" recited in claim 3 is in one embodiment based upon the difference between two phases of the output voltage of the alternator. This is supported by the

Specification at page 16, line 33 through page 17, line 1. However, in alternate embodiments, such as where the alternator has output terminals in a wye format, the "fourth RMS voltage" would be based upon the difference between a single phase of the output voltage of the alternator and a neutral point. This is supported by the Specification at page 17, lines 2-9. Thus, depending upon the embodiment, the "fourth RMS voltage" recited in claim 3 could be Phase A (referenced to ground), Phase B (referenced to ground), Phase C (referenced to ground), or the difference between any pair of Phases A, B and C.

The Examiner further indicated that claim 7 is rejected under 35 U.S.C. Section 112. However, the Applicant is unable to identify any discussion by Examiner concerning the exact reasons why claim 7 is indefinite, and so does not understand the basis for the Examiner's rejection. The Applicant is only able to repeat what the Applicant stated in the previous Office Action with respect to claim 7. Namely the Applicant respectfully submits that one of ordinary skill in the art would understand how to implement any of the proportional, proportional-integral, or proportional-integral-differential controllers of claim 7, which are well-known in the art.

As for the "half cycle of the alternator" recited in claim 14, the Applicant respectfully submits that this is a

half cycle of rotation of the alternator, as described at lines 30-31 of page 16 of the Specification.

Finally, with respect to claim 18, the Applicant again is unable to find any particular discussion by the Examiner as to the basis for the rejection of claim 18 for indefiniteness. The Applicant suspects that the Examiner is referring to the term "fourth DC-equivalent voltage" recited in claim 18, which is similar to the "fourth RMS voltage" recited in claim 3 and discussed above. Assuming this to be the case, the Applicant respectfully submits that the above discussion concerning why use of the term "fourth RMS voltage" is not indefinite equally applies to use of the term "fourth DC-equivalent voltage".

For at least these reasons, therefore, the Applicant respectfully submits that the pending claims are sufficiently definite so as to be allowable in view of 35 U.S.C. Section 112.

CLAIM REJECTIONS UNDER 35 U.S.C. Section 102(b)

The Applicant respectfully traverses the Examiner's rejection of claims 1, 5-6, 8-10, 14-16, 19 and 21-22 under 35 U.S.C. Section 102(b) as being anticipated by Stacey. Stacey appears to have an entirely different purpose than the Applicant's invention, and does not appear to relate to generating a control signal for controlling an excitation level of an alternator, as is the focus of each of independent

claims 1, 15 and 16. Consequently, the Applicant respectfully submits that the Examiner is mistaken in his statement (in Paragraph 5 of the Office Action) that elements 65, 49 and 51 in Fig. 3 of Stacey are the second calculation element, intermediate signal generation element and control signal generation element recited in independent claim 1 of the present Application. The Applicant respectfully submits that these limitations and the corresponding limitations of pending claims 15 and 16, rather than being shown in Stacey, are missing from Stacey.

Stacey appears to concern a system for sensing the rotational position of a rotating shaft (see col. 1, lines 7-10). This rotational position information is in turn used to accurately control the operation of a synchronous motor by controlling the generation of stator winding currents (see col. 2, lines 16-22). This understanding of Stacey is particularly confirmed by Fig. 3 of Stacey, which was specifically referred to by the Examiner. As shown in Fig. 3, the control signals generated by the 3-Phase PWM inverter 51, which was identified by the Examiner as corresponding to the control signal generation element of pending claim 1, are current signals used to control the stator winding currents of a 3-phase motor 45 (see col. 6, lines 21-22).

In contrast to Stacey, the Applicant's invention concerns measuring the output voltages of an alternator in order to

produce a control signal for the excitation level of the alternator. Specifically, this is made clear in claim 1, which recites the providing of a control signal used to control an excitation level of an alternator, claim 16, which recites controlling the excitation level of the alternator in response to the control signal, and claim 15, which concerns providing control signal components in order to provide a control signal to control an excitation level of an alternator.

Because the purpose of Stacey is to sense rotational position and in turn produce stator winding currents for a motor, while the Applicant's claimed invention concerns controlling an excitation level of an alternator based upon its output voltages, the Applicant respectfully submits that Stacey has an entirely different purpose than the Applicant's invention as recited in claims 1, 15 and 16. This is true on a number of levels. First, while Stacey concerns measurement and control of the position of a motor, the Applicant's invention concerns measuring the output voltage of an alternator and, based upon these measurements, controlling the excitation of the alternator. Second, while the control signals produced by Stacey are to control the stator winding currents of a motor, the control signal produced by the Applicant's invention is to control the field winding currents of the alternator, which in turn influence the overall

voltages output from the stator windings of the alternator (see the Specification at page 1, lines 14-18).

Because Stacey does not relate to controlling the excitation level of an alternator, and has an entirely different purpose than the Applicant's invention, the Applicant respectfully submits that several of the limitations in the independent claims 1, 15 and 16 that are addressed by the Examiner in Paragraph 5 of the Office Action appear to be missing from Stacey. In particular, element 51 in Fig. 3 Stacey identified by the Examiner cannot be the "control signal generation element" recited in claim 1, since element 51 does not appear to produce a control signal used to control an excitation level of an alternator. Further, because element 49 in Fig. 3 does not produce an intermediate signal that in turn is used to produce a control signal for the excitation level of an alternator, that element cannot be the "intermediate signal generation element" of pending claim 1.

Additionally, the Examiner identified element 65 in Fig. 3 of Stacey as corresponding to the "second calculation element" recited in claim 1. However, the element 65 does not appear to receive a "first indication" of a "first output voltage" of a "first phase" of an alternator, as recited in claim 1. Therefore, the Applicant does not understand how element 65 can be the second calculation element.

These same limitations likewise appear to be missing from pending claim 16. That is, the Applicant respectfully submits that each of the limitations "determining an intermediate signal in response to a target input and the first feedback signal"; "determining a control signal in response to the intermediate signal and the second feedback signal"; and "controlling the excitation level of the alternator in response to the control signal" of claim 16 appear to be missing from Stacey. Additionally, the Applicant does not understand where Stacey shows the calculating of a second feedback signal in dependence upon a first indication of an output voltage of the alternator, as recited in claim 16.

As for claim 15, as discussed above, Stacey apparently fails to disclose the providing of a control signal to control the excitation level of an alternator. Further, the Applicant is unable to find any discussion within Stacey of the updating, at two different rates, of two different control signal components provided by outer and inner control loops.

For at least these reasons, therefore, the Applicant respectfully submits that each of the pending independent claims 1, 15 and 16 is not anticipated by Stacey. Additionally, the Applicant respectfully submits that each of dependent claims 5-6, 8-10, 14, 19 and 21-22 is not anticipated by Stacey for at least these reasons.

CLAIM REJECTIONS UNDER 35 U.S.C. Section 103(a)

The Applicant further respectfully submits that, insofar as Stacey fails to disclose numerous limitations of the independent claims 1 and 16 relating to alternator control and otherwise, claims 2, 7, 11-13, 17 and 20 are also nonobvious and allowable over Stacey in view of King and ordinary skill in the art.

* * *

Conclusion

In view of the Applicant's amendments and Remarks being submitted herewith, the Applicant respectfully requests reconsideration and allowance of the present application.

The Applicant wishes to invite the Examiner to telephone the Applicant's attorney at the number listed below if discussion with the Applicant's attorney would be of assistance to the Examiner or further the prosecution of the present application.

Respectfully submitted,

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VERSION SHOWING CHANGES TO CLAIMS

4. (Amended) The system of claim 3,

wherein the system is configured to receive the output voltages of an alternator that is in at least one of a wye configuration, **and** a delta configuration**[**, a single-phase configuration, a dog-leg configuration, a zig-zag configuration, and a double delta configuration**]**;

wherein, when the alternator is in the delta configuration, the indications of the first, second and third output voltages are, respectively, an indication of a voltage difference between the output voltages of a first terminal and a second terminal of the alternator, an indication of a voltage difference between the output voltages of the second terminal and a third terminal of the alternator, and an indication of a voltage difference between the output voltages of the third and the first terminals of the alternator; and

wherein, when the alternator is in the wye configuration the indications of the first, second and third output voltages are indications of voltage differences between at least one of a neutral point and a ground of the alternator and, respectively, the output voltages of a first terminal, a second terminal and a third terminal of the alternator.